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November 3, 1995

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Subject: Docket No. 50-361 and 50-362
NRC Inspection Report 50-361/95-16 and 50-362/95-16
San Onofre Nuclear Generating Station Units 2 and 3

This letter provides additional information concerning the issues documented in the subject inspection report: (1) Section 5.2.1, "Safety-Related Valve Motor Actuator Failures," (2) Section 5.2.2, "WKM Valve Failures," and (3) Section 5.2.3, "RCP 3P002 Baffle Bolt Failure." The inspection report, dated September 22, 1995, judged each of these issues as lacking a thorough engineering evaluation.

SAFETY-RELATED VALVE MOTOR ACTUATOR FAILURES

95-16, Section 5.2.1, states in part:

> Since May 1995, the licensee has identified failures of motor-operated valves, and significant degradation of a valve. Unit 3 refueling water storage tank (RWST) outlet Isolation Valve 3HV9301 failed during valve testing, and failures of the outlet isolation valves for the other Unit 3 RWST and for one Unit 2 RWST were documented in NRC Inspection Report 50-361/95-07. These failures were caused by motor actuator problems. The inspector considered the incidence of failure of safety-related valves in general to be higher than expected, and noted that additional attention to the root cause of these failures appeared to be warranted.

Based on discussions with the Senior Resident Inspector, just prior to the issuance of the report, the conclusion above regarding motor-operated valve (MOV) failure rate was based on the

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inspector's experience at Palo Verde and discussions with other Region IV inspectors. No quantitative data was used to draw this conclusion. In our efforts to pursue the NRC concerns with our recent valve failures, Edison's Reliability Engineering group reviewed INPO's Nuclear Plant Reliability Data System (NPRDS) to determine how Edison's MOV failure rate compares with similar plants in Region IV. The survey found that SONGS MOV valve performance is comparable to similar Region IV plants. For example, the following is a comparison of MOV failure rates between San Onofre and Palo Verde Nuclear Generating Station for the period December 1991 through May 1995:

	San Onofre 2/3	Palo Verde 1/2/3
Number of Failures	26	131
Failure Rate (failure/component-hour)	1.75E-06	2.96E-06

WKM VALVE FAILURES

Inspection Report 95-16, Section 5.2.2, states in part:

> The inspector concluded that the licensee had thoroughly evaluated and corrected the recent failure of valve 3HV9339, but previously may not have accurately assessed the susceptibility of the WKM SDC valves to the failure of their internals.

In 1988, when Edison first experienced problems with WKM Main Steam Isolation Valves (MSIV), a root cause evaluation (RCE) was performed to determine the failure mechanism of the valves. Edison's RCE determined that shoe/rail interactions and high speed operation caused the MSIV failures experienced.

As an independent check of our conclusions, Edison also contracted Kalsi & Associates to evaluate the valve failures and to recommend potential corrective actions. The Kalsi findings indicated that high speed WKM valves (such as MSIVs), were susceptible to certain types of failure modes and validated Edison's RCE on the failure mechanism. As a result of the Kalsi findings, the MSIVs were modified incorporating a

modified shoe/rail design. The Kalsi report indicated that slow speed motor-operated WKM valves, such as 3HV9339, were far less susceptible to the same type of failure mechanism (guide rail failure).

Irrespective of the cause of the failure, a repeat failure of the low speed safety related valves is now considered extremely unlikely since, as a part of our GL 89-10 program, we revised the opening control switch logic of all MOV operated WKM valves, to use a limit switch cut off instead of a preset torque cut off. This avoids interaction of the shoe and guide rail in the closing direction (the interaction which causes the guide rail failure).

On August 23, 1995, Edison management met with NRC Region IV management in Arlington, Texas to present the experience we had with WKM valves, and to present the specific details surrounding the failure of WKM valve 3HV9339. In this presentation, we discussed why Edison chose the corrective actions implemented and their engineering basis. We discussed our conclusion that the failure of MOV 3HV9339 to fully open was anomalous and slow speed WKM valves remain far less susceptible to guide rail failure. We also indicated that our research showed that failures of the WKM valves were occurring at a frequency approximately equal to that of other MOV's in the industry. We believe our previous actions related to WKM valves were reasonable and prudent based on known information.

RCP 3P002 BAFFLE BOLT FAILURE

Inspection Report 95-16, Section 5.2.3, states in part:

> The inspector concluded that the licensee's recent engineering actions in monitoring and inspecting the RCP, identifying and evaluating the deficiencies, and determining appropriate corrective actions, were excellent. However, the inspector also noted that more thorough engineering attention following previous occurrences of RCP baffle bolt failures may have prevented the most recent problem.

When RCP baffle bolt failures were first identified in 1991, Edison performed an extensive root cause analysis to determine all potential causes. We concluded that the initial baffle-to-shaft joint design was of low design margin. Edison

initiated interim, and long term, corrective measures to increase the margin. The interim corrective action was to utilize a new baffle bolt anti-embedment process. The long term corrective action was to redesign the baffle to shaft joint attachment, utilizing a taper ring and compression fit, to stiffen the joint and provide increased margin to fatigue failure. This was a unique effort since Edison does not normally redesign the internals of a suppliers product.

Once the new design was developed, and tested, Edison systematically implemented the new design. Currently, the new design retrofit has been completed on two pumps in Unit 2, and three pumps in Unit 3. The phasing in of the new design requires careful coordination in that it is high radiation dose work that can only be performed with the RCS drained to midloop.

Edison does not believe the recent baffle bolt failures on RCP 3P002 are related to the previous baffle bolt deficiencies. RCP 3P002 had undergone the interim corrective action of the anti-embedment technique, but it had not undergone the long term taper ring modification. We believe the taper ring modification would have prevented the 3P002 baffle bolt failures, but do not believe that any other presently known measure would have substantially changed the situation as regards this specific pump.

At the NRC Region IV management meeting on August 23, 1995, Edison presented our experience associated with RCP baffle bolts. In that presentation, we discussed our engineering judgement in assessing the baffle bolt failures. We noted we recognized the inherent weakness in the original supplier design of the RCP baffle bolts and how we took prudent interim, and long term, corrective actions to address those problems. We fully understood the design problems associated with the RCP baffle bolts, and had a prudent corrective action strategy to address the problems. From the response we received at the management meeting, we believed the NRC understood our actions and our position appeared to be well received by Region management.

Contrary to comments made in IR 95-16, Edison does not believe more thorough engineering attention following previous occurrences of RCP baffle bolt failures would have had a meaningful likelihood of preventing the most recent problem.

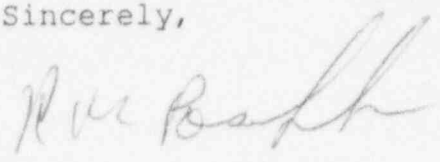
CONCLUSION

We appreciate this opportunity to clarify the events discussed in inspection report IR 95-16. We submit this information in an

effort to enhance and clarify the record, and trust you will take whatever action you deem appropriate in light of this additional information.

If you have any questions regarding this matter, please contact me.

Sincerely,



cc: L. J. Callan, Regional Administrator, NRC Region IV
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